

CHAPTER 203  
GENERAL REQUIREMENTS FOR ALL OBJECTS

[Prior to 1/14/98, see 347—Chs 41 to 49]

**875—203.1(89) Hydrostatic pressure tests.** A hydrostatic pressure test, when applied to objects, shall not exceed  $1\frac{1}{2}$  times the maximum allowable working pressure, less corrosion factor, as applicable. The pressure shall be under proper control so that in no case shall the required test pressure be exceeded by more than 2 percent. During a hydrostatic test involving pressures in excess of the lowest safety valve setting, the safety valve or valves shall be removed or each valve disk shall be held to its seat by means of a testing clamp and not by screwing down the compression screw upon the spring. Other safety devices that may be damaged shall be removed prior to applying a hydrostatic test. When a hydrostatic test is to be applied to existing installations, the pressure shall be as follows:

1. To determine tightness, the hydrostatic test pressure need be no greater than the set pressure of the safety valve having the lowest setting.
2. For safety tests, the pressure shall be equal to 2 times the maximum allowable working pressure, less corrosion factor, as applicable. All major repairs and alterations shall require a safety test.

**875—203.2(89) Safety appliance.** Any safety appliance required shall not be removed or tampered with except for the purpose of repair or inspection. An object shall not be operated unless all applicable safety appliances are properly functional and operational.

**875—203.3(89) Pressure-reducing valves.** Where pressure-reducing valves are used, one or more relief or safety valves shall be provided on the low-pressure side of the reducing valve when the piping equipment on the low-pressure side does not meet the requirements for the full initial pressure. The relief or safety valves shall be located adjoining or as close as possible to the reducing valve. Proper protection shall be provided to prevent injury or damage caused by the escaping fluid from the discharge of relief or safety valves if vented to the atmosphere. The combined discharge capacity of the relief valves or safety valves shall be such that the pressure rating of the lower-pressure piping or equipment shall not be exceeded in case the reducing valve sticks open. If a bypass around the reducing valves is used, a safety valve is required on the low-pressure side and shall be of sufficient capacity to relieve all the fluid that can pass through the bypass without overpressuring the low-pressure side. A pressure gage shall be installed on the low-pressure side of a reducing valve.

**875—203.4(89) Blowoff equipment.** The blowdown from an object that enters a sanitary sewer system or blowdown which is considered a hazard to life or property shall pass through some form of blowoff equipment that will reduce pressure and temperature. The temperature of the water leaving the blowoff equipment shall not exceed 150 degrees F, and the pressure shall not exceed 5 psig. The blowoff piping and fittings between the object and the blowoff tank shall comply with the construction or installation code. All materials used in the fabrication of object blowoff equipment shall comply with the construction or installation code. All blowoff equipment shall be equipped with openings to facilitate cleaning and inspection.

**875—203.5(89) Location of discharge piping outlets.** The discharge from safety valves, safety relief valves, blowoff pipes and other outlets shall be so arranged that there will be no danger of scalding personnel. When the safety valve or temperature/pressure relief valve discharge is piped away from the object to the point of discharge, provision shall be made for properly draining the piping. The size and arrangement of discharge piping shall be such that any pressure that may exist or develop will not reduce the relieving capacity of the relieving devices below that capacity required to protect the object.

**875—203.6(89) Piping, valves, and fitting requirements.** No galvanic pipe, valve, or fittings may be used on any object. The minimum piping, valve, and fitting supplied on any object shall be Schedule 40. The piping design must take into account the removal of material for mechanical joints such as threading or bolting, corrosion and erosion requirements, and the effects of hydrostatic head pressure. ASME B31.1 and ASME B31.9 (1998 with 1999 and 2000 addenda) provide the applicable standards and calculations for piping design.

**875—203.7(89) Electric steam generator.**

**203.7(1)** A cable at least as large as one of the incoming power lines to the generator shall be permanently fastened to and provide grounding of the generator shell.

**203.7(2)** A suitable screen or guard shall be provided around high-tension bushings and a sign posted warning of high voltage. This screen or guard shall be so located that it will be impossible for anyone working around the generator to accidentally come in contact with the high-tension circuits.

**203.7(3)** All electrically heated boilers shall meet the applicable standards of the construction or installation code.

**875—203.8(89) Alterations, retrofits and repairs to objects.** Alterations, retrofits, and repairs shall be made so that the object shall be at least as safe as the original construction. Alterations, retrofits, and repairs not covered by these rules shall be done as though new construction and shall comply with the applicable code or codes. The appropriate National Board “R” form shall be filed with the division.

**203.8(1) Welding.** Repairs or alterations by welding shall be approved beforehand by an authorized inspector, and all welding repairs or alterations must be in accordance with the “Repairs and Alterations to Boilers and Pressure Vessels by Welding,” part RC and part RD, National Board Inspection Code (1998 with 1999 and 2000 addenda). All welding shall be done by an organization holding a National Board “R” stamp. The organization performing the repair or alteration is responsible for filing the appropriate National Board “R” form with the division and the National Board of Boiler and Pressure Vessel Inspectors.

The material used for patches shall be of the same general quality and have at least the minimum physical properties of the plate to be patched. The thickness of any patch shall be at least equal to the plate being patched. Flush-welded patches in unstayed shells, drums, or headers shall be radiographed and stress-relieved in accordance with the requirements of the construction or installation code.

**203.8(2) Stress-relieving of alterations and repairs.** Subject to the approval of the labor commissioner, peening or other methods of stress-relieving may be substituted for thermal stress-relieving. Flush-welded patches or new sections may be applied to stayed plates without limitations of size or plate thickness.

Threaded stays may be replaced by welded stays provided that in the judgment of the authorized inspector the plate adjacent to the staybolt has not been materially weakened by deterioration or wasting away. All material requirements of the applicable section of the construction or installation code governing welded stays shall be met except that stress-relieving other than thermal means may be used.

**875—203.9(89) Boiler door latches.** A watertube boiler shall have the firing doors of the inward opening type, unless such doors are provided with substantial and effective latching or fastening devices or otherwise so constructed as to prevent them when closed from being blown open by pressure on the furnace side. These latches or fastenings shall be of the positive, self-locking type. Friction contacts, latches, and bolts actuated by springs shall not be used. The foregoing requirements for latches or fastenings shall not apply to coal openings on downdraft or similar furnaces.

All other doors, except explosion doors, not used in the firing of the boiler may be provided with bolts or fastenings in lieu of self-locking latching devices. Explosion doors, if used and located in the setting walls within seven feet of the firing floor or operating platform, shall be provided with substantial deflectors to divert the blast.

**875—203.10(89) Clearance.** All objects shall be so located that adequate space is provided for the proper operation, inspection, and necessary maintenance and repair of the object and its appurtenances.

**875—203.11(89) Ladders and runways.** When necessary for safety, a steel runway platform of standard construction shall be installed across the tops of objects or at some other convenient level for the purpose of affording safe access. All runways shall have at least two means of exit remotely located from each other.

**875—203.12(89) Exit from rooms containing objects.** All rooms exceeding 500 square feet of floor area and containing one or more objects having a fuel-burning capacity of 1 million Btu's shall have two means of exit remotely located from each other on each level.

**875—203.13(89) Air and ventilation.** A permanent source of outside air shall be provided for each room to permit satisfactory combustion of fuel and ventilation if necessary under normal operations.

The minimum ventilation for coal, gas, or oil burners in rooms containing objects is based on the Btu's per hour, required air, and louvered area. The minimum net louvered area shall not be less than 1 square foot. The following table shall be used to determine the net louvered area in square feet:

INPUT (BTUs per hour)	MINIMUM AIR REQUIRED (cubic feet)	MINIMUM LOUVERED AREA (net square feet)
500,000	125	1.0
1,000,000	250	1.0
2,000,000	500	1.6
3,000,000	750	2.5
4,000,000	1,000	3.3
5,000,000	1,200	4.1
6,000,000	1,500	5.0
7,000,000	1,750	5.8
8,000,000	2,000	6.6
9,000,000	2,250	7.5
10,000,000	2,500	8.3

When mechanical ventilation is used, the supply of combustion and ventilation air to the objects and the firing device shall be interlocked with the fan so the firing device will not operate with the fan off. The velocity of the air through the ventilating fan shall not exceed 500 feet per minute and the total air delivered shall be equal to or greater than shown above.

**875—203.14(89) Condensate return tank.** Condensate return tanks shall be equipped with at least two vents or a vent and overflow pipe to protect against a loose float plugging a single connection.

**875—203.15(89) Nuclear power plant components.** Nuclear power systems shall be designed, manufactured, installed, stamped, inspected, repaired and maintained in accordance with the ASME Code, Section III, for the year of construction or installation.

**875—203.16(89) Conditions not covered.** For any condition or modification not covered by these rules, the ASME Code for New Installations (1995 with 1997 addenda) shall apply.

**875—203.17(89) Stamping of Iowa identification number.** All objects shall be stamped with an Iowa identification number followed by an "IA," the letters and figures to be not less than a height of 5/16 of an inch. Stamping of the Iowa identification number shall be located on steel objects below the ASME Code stamping. When construction of the object does not allow the direct stamping of an object, a metal tag the size of 1 inch by 2½ inches shall be affixed to the object with the Iowa identification number. This tag shall be attached as closely as possible to the manufacturer's data plate of the object. For objects covered by Iowa Code chapter 89 which are unstamped, state inspectors and special inspectors shall assign numbers as directed by the division.

**875—203.18(89) Nonstandard objects.** If a nonstandard object as defined in rule 875—200.2(89) is to be installed in Iowa, all of the following conditions must first be met.

**203.18(1)** The blueprints and design calculations for construction of the object must be submitted to the labor commissioner for review and approval before any installation work is commenced. All units of measure on submitted paperwork must be scaled to customary United States units of measure. All documents must be provided in the English language.

**203.18(2)** The blueprints and design calculations for construction of the object must be certified by a professional engineer who is registered in the United States for the design of objects. The manufacturer's data report or design documentation records must be signed by a special inspector who is commissioned by the labor commissioner or by a division employee holding a National Board commission and a state commission.

**203.18(3)** The blueprints and design calculations of these objects shall be prepared utilizing a specified, stated, known engineering standard such as the DIN, ISO, BSI, ASME, JIS or CNS.

**203.18(4)** All documentation verifying quality and code compliance shall be submitted to the division for review and approval by the labor commissioner unless there is an agreement which provides for reciprocity between the division and the jurisdiction in which the object was built. The quality assurance system shall include, but is not limited to:

a. Quality assurance documentation. The quality assurance documentation shall include the following: statement of authority, scope of work addressed, organizational charts, quality control responsibilities, drawings and design, calculation, specification control, order entry, purchasing, training, audits, auditor training, material control, examination and inspection programs, correction and detection of non-conformities, welding controls, nondestructive examination and personnel qualifications, heat treatment, calibration of test equipment, records retention, sample forms, and duties of the authorized inspector; or the requirements of ANSI/ASQC Q 91-1994 or ASME NQA 1-1989 with 1C-1992 addenda.

b. Certification from a registered professional engineer knowledgeable about the code of construction and installation; and

c. Implementation of all phases of the quality assurance system(s) and certification(s) shall be demonstrated.

**203.18(5)** An English language version of the documents described in subrule 203.18(4), shall be submitted for review by the labor commissioner. The English language versions of the documents shall control during any implementation or demonstration of the fabrication of the nonstandard object. The documentation and certification described in subrule 203.18(4), if in a language other than English, must include a statement that in case of a conflict, the translated English language version shall prevail.

**203.18(6)** The fees and costs for the review shall be borne by the manufacturer, owner, or user of the object requesting the review and shall include, but not be limited to, the inspection fees set forth in rule 875—200.4(89). Fees and costs shall include travel, lodging, meals, and incidental costs associated with performing the review or audit. If the review is outside the United States, the party or parties requesting the review shall be responsible to arrange all travel permits and visas. A party requesting a review or audit shall guarantee access to all phases of manufacture, regardless of who is the owner of a relevant facility.

**203.18(7)** After a manufacturer has received permission to construct a nonstandard object for an Iowa location, the manufacturer shall construct the object complying with all quality standards approved and certified for Iowa installation and construction. Compliance with this rule during the installation and construction phases shall not in any way be viewed as creating an exception from any provisions of Iowa Code chapter 89 or IAC 875—Chapters 200 to 209.

**875—203.19(89) Notification of explosion.** Owners and users of covered objects must report any object explosion by calling (515)281-3647 or (515)281-6533. If the explosion occurs during normal division operating hours, notification shall occur before close of business on that day. If the explosion occurs when the division office is closed, the notification shall occur no later than close of business on the next division business day. Division hours are 8 a.m. to 4:30 p.m., Monday through Friday, except state holidays.

**875—203.20(89) Lap seam crack.** The shell or drum of an object in which a lap seam crack is discovered along a longitudinal, riveted joint shall be immediately discontinued from use. If the object is not more than 15 years of age, a complete new course of the original thickness may be installed at the discretion of the inspector. Patching is prohibited.

**875—203.21(89) Evaluation of design margin.** The provisions of the Welding Research Council “Bulletin,” No. 435, September 1998, are adopted by reference as they pertain to design margin in construction, repairs, and alterations. These provisions shall be utilized where a design margin of less than four is used for design construction, repair, or alteration of boiler pressure vessels as defined in Iowa Code chapter 89.

These rules are intended to implement Iowa Code chapter 89.

[Filed emergency 12/26/97 after Notice 11/19/97—published 1/14/98, effective 1/1/98]

[Filed 3/14/01, Notice 1/24/01—published 4/4/01, effective 5/9/01]